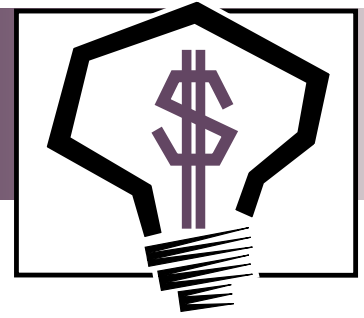


# INVENTIONS & INNOVATION

## Project Fact Sheet



## ENERGY FROM ORGANIC WASTE

### BENEFITS

- Energy savings by capitalizing on the unrealized energy value of waste, which approaches that of a million barrels of oil per day
- Produces significant renewable energy that can replace imported energy sources
- Reduces need to landfill municipal waste, which currently costs about \$30 billion annually
- Eliminates elaborate cleanup equipment
- Stands alone or easily meshes with a customer's existing or planned waste disposal strategies
- Operates without discharging objectionable pollutants, smoke, or odors
- Costs less to operate than other waste-to-energy systems

### APPLICATIONS

This technology is being developed to apply to municipal solid waste used as fuel in the production of energy.

Aspects of the technology have been applied to the use of coal, but other fuel materials may be used, such as sewage and paper mill sludges, hazardous wastes, biomass, agricultural residues and manures, industrial sludges, and coal fines.

## TURNING ORGANIC WASTE INTO A PROFITABLE, RENEWABLE, AND ENVIRONMENTALLY SOUND LIQUID FUEL

If municipal and other organic wastes such as cardboard could be harnessed to provide energy without causing pollution, they would be a virtually limitless energy source that would also conserve the United States' dwindling landfill space.

To accomplish this, three major hurdles would need to be overcome: combustible and non-combustible components need to be separated, metals and glass must be recovered, and the remaining waste needs to be converted to energy in a nonpolluting way.

Wet thermal oxidation is proposed to produce energy from waste without polluting incineration. This type of combustion has been studied extensively in connection with coal, but has not been applied to other fuels. The system would not discharge pollutants, smoke, or odors. Wet thermal oxidation can handle waste in a continuous, enclosed process with much lower pollution and higher efficiency than the "mass burn" incinerators that are commonly used now.

### MUNICIPAL SOLID WASTE



**About 100 million tons of municipal solid waste are disposed of in landfills every year. If this could instead be used for energy, it could make the import or production of 100 million barrels of oil a year unnecessary.**



## Project Description

**Goal:** The goal of the project is to demonstrate the feasibility of integrating EnerTech's SlurryCarb™ technology with its pressurized combustion technology to produce a clean and renewable energy source that minimizes combustion by-products. The project will 1) determine the integrated system reaction kinetics, 2) characterize flue gas emissions from the system, 3) characterize the combustion ash, 4) determine the integrated system efficiency, and 5) estimate market potential through economic modeling.

The waste is first separated into combustible and noncombustible components using conventional hydrocloning technology. The metal is recovered for recycling. The remaining combustible material is then pulped in a water solution. The resulting pulp is carbonized to increase its fuel value from that equivalent to paper to the equivalent of a medium-grade coal. The resulting slurry is pumpable and consists of about 42% high-Btu solids. In a reactor, the preheated slurry is oxidized under pressure, producing high-pressure steam that can drive turbines to generate energy. The waste does not produce air pollution because it combusts without flame or smoke.

This SlurryCarb™ process developed by EnerTech concentrates the waste materials into a high-value liquid fuel that is cleaner to combust than most coals. The liquid fuel generated from the process is suitable for combustion, co-firing, or reburning in industrial and utility coal boilers.

EnerTech Environmental, Inc. is developing this new technology with the help of a grant funded by the Inventions and Innovation Program through the Department of Energy's Office of Industrial Technologies.

## Progress and Milestones

- The carbonization step has been tested and evaluated at the Energy and Environmental Research Center at the University of North Dakota.
- The technology has been successfully demonstrated at the 25-ton-per-day level.
- Partners for installation of commercial facilities throughout the United States and internationally are being pursued.
- EnerTech has received 13 U.S. patents for the SlurryCarb™ technology with two outstanding international patent filings in 20 countries under the Patent Cooperation Treaty, covering a total of 3.3 billion people.



The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and conduct early development. Ideas that have significant energy savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

## PROJECT PARTNERS

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